### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Sadanand V. Deshpande, et al.

Examiner: Wojciechowicz, Edward J.

Serial No:

10/751,831

Docket:

FIS920030078US2 (16422A)

Filed:

January 5, 2004

**Art Unit:** 

2815

Dated:

November 15, 2004

For:

STI STRESS MODIFICATION BY NITROGEN PLASMA TREATMENT FOR

IMPROVING PERFORMANE IN SMALL WIDTH DEVICES

Commissioner for Patents P. O. Box 1450 Alexandria, VA 23313-1450

# SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 C.F.R. §§1.56, 1.97 and 1.98, applicants submit the following references which applicants believe may be material to the above-identified patent application. A copy of the references which applicants wish to make of record in this case is enclosed herein for the Examiner's convenience along with a listing on Form PTO-1449 attached.

- 1. U.S. Patent No. 3,602,841, dated August 31, 1971, issued to McGroddy;
- 2. U.S. Patent No. 4,655,415, dated May 12, 1987, issued to Esaki, et al.;
- 3. U.S. Patent No. 4,853,076, dated August 1, 1989, issued to Tsaur, et al.;

# **CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, P.O. Box 1450, Alexandria, VA 22313-1450 on the date set forth below.

Dated: November 15, 2004

Leslie & Sziwos, Ph.D.

- 4. U.S. Patent No. 4,855,245, dated August 8, 1989, issued to Neppl, et al.;
- 5. U.S. Patent No. 4,952,524, dated August 28, 1990, issued to Lee, et al.;
- 6. U.S. Patent No. 4,958,213, dated September 18, 1990, issued to Eklund, et al.;
- 7. U.S. Patent No. 5,006,913, dated April 9, 1991, issued to Sugahara, et al.;
- 8. U.S. Patent No. 5,060,030, dated October 22, 1991, issued to Hoke;
- 9. U.S. Patent No. 5,081,513, dated January 14, 1992, issued to Jackson, et al.;
- 10. U.S. Patent No. 5,108,843, dated April 28, 1992, issued to Ohtaka, et al.;
- 11. U.S. Patent No. 5,134,085, dated July 28, 1992, issued to Gilgen, et al.;
- 12. U.S. Patent No. 5,310,446, dated May 10, 1994, issued to Konishi, et al.;
- 13. U.S. Patent No. 5,354,695, dated October 11, 1994, issued to Leedy;
- 14. U.S. Patent No. 5,371,399, dated December 6, 1994, issued to Burroughes, et al.;
- 15. U.S. Patent No. 5,391,510, dated February 21, 1995, issued to Hsu, et al.;
- 16. U.S. Patent No. 5,459,346, dated October 17, 1995, issued to Asakawa, et al.;
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- 18. U.S. Patent No. 5,557,122, dated September 17, 1996, issued to Shrivastava, et al.;

- 19. U.S. Patent No. 5,561,302, dated October 1, 1996, issued to Candelaria;
- 20. U.S. Patent No. 5,565,697, dated October 15, 1996, issued to Asakawa, et al.;
- 21. U.S. Patent No. 5,571,741, dated November 5, 1996, issued to Leedy, et al.;
- 22. U.S. Patent No. 5,592,007, dated January 7, 1997, issued to Leedy;
- 23. U.S. Patent No. 5,592,018, dated January 7, 1997, issued to Leedy;
- 24. U.S. Patent No. 5,670,798, dated September 23, 1997, issued to Schetzina;
- 25. U.S. Patent No. 5,679,965, dated October 21, 1997, issued to Schetzina;
- 26. U.S. Patent No. 5,683,934, dated November 4, 1997, issued to Candelaria;
- 27. U.S. Patent No. 5,840,593, dated November 24, 1998, issued to Leedy;
- 28. U.S. Patent No. 5,861,651, dated January 19, 1999, issued to Brasen, et al.;
- 29. U.S. Patent No. 5,880,040, dated March 9, 1999, issued to Sun, et al.;
- 30. U.S. Patent No. 5,940,736, dated August 17, 1999, issued to Brady, et al.;
- 31. U.S. Patent No. 5,946,559, dated August 31, 1999, issued to Leedy;
- 32. U.S. Patent No. 5,960,297, dated September 28, 1999, issued to Saki;
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- 53. U.S. Patent No. 6,319,794, dated November 20, 2001, issued to Akatsu, et al.;
- 54. U.S. Patent No. 6,361,885, dated March 26, 2002, issued to Chou;
- 55. U.S. Patent No. 6,362,082, dated March 26, 2002, issued to Doyle, et al.;
- 56. U.S. Patent No. 6,368,931, dated April 9, 2002, issued to Kuhn, et al.;
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- 71. U.S. Patent Application Publication No. 2002/0086472 A1, dated July 4, 2002, issued to Roberds, et al.;
- 72. U.S. Patent Application Publication No. 2002/0086497 A1, dated July 4, 2002, issued to Kwok;
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- 74. U.S. Patent Application Publication No. 2003/0032261 A1, dated February 13, 2003, issued to Yeh, et al.;
- 75. U.S. Patent Application Publication No. 2003/0040158 A1, dated February 27, 2003, issued to Saitoh;
- 76. U.S. Patent Application Publication No. 2003/0057184 A1, dated March 27, 2003, issued to Yu, et al.;
- 77. U.S. Patent Application Publication No. 2003/0067035 A1, dated April 10, 2003, issued to Tews, et al.;
- 78. Rim, et al., "Transconductance Enhancement in Deep Submicron Strained-Si *n*-MOSFETs", International Electron Devices Meeting, 26, 8, 1, IEEE, September 1998;
- 79. Rim, et al. "Characteristics and Device Design of Sub-100 nm Strained Si N- and PMOSFETs", 2002 Symposium On VLSI Technology Digest of Technical Papers, IEEE, pp 98-99;
- 80. Scott, et al. "NMOS Drive Current Reduction Caused by Transistor Layout and Trench Isolation Induced Stress", International Electron Devices Meeting, 34.4.1, IEEE, September 1999;

- 81. Ootsuka, et al. "A Highly Dense, High-Performance 130nm node CMOS Technology for Large Scale System-on-a-Chip Application", International Electron Device Meeting, 23.5.1, IEEE, April 2000;
- 82. Ito, et al. "Mechanical Stress Effect of Etch-Stop Nitride and its Impact on Deep Submicron Transistor Design", International Electron Devices Meeting, 10.7.1, IEEE, April 2000;
- 83. Shimizu, et al. "Local Mechanical-Stress Control (LMC): A New Technique for CMOS-Performance Enhancement", International Electron Devices Meeting, IEEE, March 2001;
- 84. Ota, et al. "Novel Locally Strained Channel Technique for high Performance 55nm CMOS", International Electron Devices Meeting, 2.2.1, IEEE, February 2002.
- 85. Ouyang, et al. "Two-Dimensional Bandgap Engineering in a Novel Si/SiGe pMOSFETS With Enhanced Device Performance and Scalability", Microelectronics Research Center, pp 151-154, 2000 IEEE.
- 86. Sayama et al., "Effect of < Channel Direction for High Performance SCE Immune pMOSFET with Less Than 0.15um Gate Length" ULSI Development Center, pp27.5.1-27.5.4, 1999 IEEE.
- 87. European Patent Application Publication No. EPO 01/62362, 26/06/89, issued to Hasegawa, Michihiko;
- 88. European Patent Application Publication No. EP 1 174 928 A1, dated 01/23/02, issued to Hitachi Ltd.;
- 89. European Patent Application Publication No. EP 0 967 636 A2, dated 12/29/1999, issued to Rengarajan, et al.;
- 90. International Patent Application Publication No. WO 02/454156 A2, dated 06/06/2002, issued to Armstrong et al.;
- 91. International Application Publication No. WO 94/27317, dated 05/06/1993, issued to Winnerl, et al.;

In accordance with the waiver of 37 C.F.R. § 1.98 (a)(2)(i), per 1276 OG 55, August 5, 2003, applicants are not required to submit copies of the above-cited U.S. Patent references. Inasmuch as this Information Disclosure Statement is being submitted in accordance with the schedule set out in 37 C.F.R. § 1.97(b), no statement or fee is required.

Respectfully submitted

Lesle S/Szivos

Registration No. 39,394

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Docket Number (Optional)

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Application Number

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Docket Number (Optional)
FIS920030078US2 (16422A)
Applicant(s)
Sadanand V. Deshpande, et al.
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Docket Number (Optional) Application Number FIS920030078US2 (16422A) Unassigned Applicant(s)

Sadanand V. Deshpande, et al. Filing Date

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Docket Number (Optional) Application Number FIS920030078US2 (16422A) Unassigned Applicant(s) Sadanand V. Deshpande, et al. Filing Date Group Art Unit

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			U.S	. PATENT	DOCUMENTS					
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		5,960,297`	09/28/99	Saki						
		5,989,978	11/23/99	Peidous						
		6,008,126	12/28/99	Leedy						
		6,025,280	02/15/00	Brady,	et al					
		6,046,464	04/04/00	Schetzir	12					
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		U.S. PA	ATENT DOCUMENTS				
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	6,066,545	05/23/00	Doshi et al.				
	6,090,684	07/18/00	Ishitsuka et al.				
	6,107,143	08/22/00	Park et al.				
	6,117,722	09/12/00	Wuu et al.				
	6,165,383	12/26/00	Chou				
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Docket Number (Optional) Application Number FIS920030078US2 (16422A) Unassigned Applicant(s) Sadanand V. Deshpande, et al. Filing Date Group Art Unit Herewith

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		6,221,735	04/24/01	Manley,	, et al						
		6,228,694	05/08/01	Doyle, e	t al						
		6,246,095	06/12/01	Brady, e	et al						
		6,255,169	07/03/01	Li, et al							
		6,261,964	07/17/01	Wu, et a	ıl						
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	6,265,317	07/24/01	Chiu et al.						
	6,274,444	08/14/01	Wang						
	6,281,532 B1	08/28/01	Doyle et al.						
	6,284,623	09/04/01	Zhang et al.						
	6,284,626	09/04/01	Kim				-		
	6,319,794	11/20/01	Akatsu, et al.						
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Docket Number (Optional) FIS920030078US2 (16422A)	Application Number Unassigned
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		6,361,885	03/26/02	Chou								
		6,362,082	03/26/02	Doyle, e	et al							
		6,368,931	04/09/02	Kuhn, e	t al							
		6,403,486	06/11/02	Lou								
		6,403,975	06/11/02	Brunner	r, et al							
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	6,406,	973 B1	06/18/02	Lee						
	6,461,	936	10/18/02	Von Ehrenwall						
	6,476,	462 B1	11/05/02	Shimizu et al.						
	6,493,		12/10/02	Ramdani, et al.						
	6,498,		12/24/02	Lach, et al						
	6,501,		12/31/02	Yu, et al.						
	6,506,		01/14/03	Jan, et al						
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		6,509,618	01/21/03	Jan, et al							
		6,521,964	02/18/03	Jan, et al							
		6,531,369	03/11/03	Ozkan, e	t al						
		6,531,740	03/11/03	Bosco, et	al						
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